Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

9.9
64Ur
2

INTERMOUNTAIN FOREST & RANGE EXPERIMENT STATION
507 25th STREET, OGDEN, UTAH 84401

USDA Forest Service
Research Note INT-216

March 1977

PROTECTING AND STORING INCREMENT CORES IN PLASTIC STRAWS

Dennis M. Cole[1]

ABSTRACT

Percent shrinkage of lodgepole pine increment cores sealed in plastic drinking straws and stored for varying periods up to 31 days was compared to the method of soaking air-dried cores to restore their dimensions. Instructions are given for sealing straws with tape and recommendations made for various situations when original dimensions cannot be measured at time of core extraction.

KEYWORDS: increment core shrinkage, increment core storage

For years drinking straws have been used to protect increment cores being transported from field to office, and to store cores for later measurement. Usually, the core is placed in the straw and the ends folded and crimped to confine the core. This does not protect the core from drying and shrinking; therefore, cores must be soaked in water to restore them when original dimensions are important (Brace 1966). Although effective, soaking is troublesome and may not be necessary.

I find that plastic straws, properly sealed with cellulose-acetate tape (one brand is Scotch Magic Transparent Tape[2]), protect cores from shrinkage for several days (paper straws are less effective and are now nearly unobtainable). Following is the method for sealing the straws, and the results of tests illustrating effectiveness of the method.

---

[1] Research Forester, located at the Intermountain Station's Forestry Sciences Laboratory, Bozeman, Montana.

[2] Use of trade or firm names is for reader information only, and does not constitute endorsement by the U.S. Department of Agriculture of any commercial product or service.

STRAW SEALING METHOD

Seal one end of straw with 3/4-inch-wide, cellulose-acetate tape, by wrapping a strip of tape around approximately 3/8 inch of the end of the straw to form an extended tape tube, then firmly pressing together the adhesive inner surface of the tube to form a flattened tab. Draw the tab (especially the edges) between the thumbnail and first finger to insure seal. Immediately upon extraction from the tree, insert the core into the prepared straw and seal the open end as above. To accommodate cores longer than the common 8¼-inch plastic drinking straw, join straws by slightly flaring the end of one straw with the tapered end of a pencil and firmly insert another straw into the flared end. The connection should be wrapped with the cellulose-acetate tape. The straw can be labeled by marking the tab with a ballpoint pen or pencil (other types of moisture resistant tape can be used, but to my knowledge, only the cellulose-acetate tape can be marked with pen or pencil).

A TEST METHOD

Increment cores were taken from 24 lodgepole pine trees growing in the Gallatin National Forest near Bozeman, Montana, in August 1975. Immediately upon extraction, cores were placed in a precision jig and marked at 0.500 and 4.000 inches from the cambial surface (accuracy ±0.002 inch to determine if the more recent wood (sapwood) might shrink more than the older wood (heartwood). Cores were placed in plastic straws and sealed with cellulose-acetate tape as described; then randomly divided into two groups of 12 straws each, to test the effectiveness of the tape seal under 3-day and 21-day office storage. At the end of each storage period, the appropriate straws were opened and the marked segments on each core were immediately measured to the nearest 0.001 inch.

To provide a basis for comparison, the cores were allowed to air-dry for several weeks under office conditions; then a random sample of 12 cores was drawn and soaked in water for 30 minutes, and the marked segments measured after soaking. The results are summarized in table 1.

Percent shrinkage in the straws was greater in 0.500-inch segments (representative of sapwood) than in the 4.000-inch segments (representative of heartwood), but was significantly greater only for the 21-day storage period. The greater percent shrinkage in the 21-day storage versus the 3-day storage was statistically significant for both 0.500-inch and 4.000-inch segments.

Table 1.--*Original length, shrinkage after two storage periods in sealed straws, and shrinkage remaining after soaking for 12 increment core segments.*[1]

Original length of core segments	3-day storage		21-day storage		Shrinkage remaining after 30-minute soaking treatment	
Inches	*Inches*	*Percent*	*Inches*	*Percent*	*Inches*	*Percent*
0.500	0.007	(1.4)^{a}	0.016	(3.2)^{b}	0.000	(0.0)
4.000	.008	(.2)^{a}	.049	(1.2)^{c}	.012	(.3)

---

[1] Percentages having different letter superscripts are significantly different at 0.05 level (diagonal comparisons not intended).

The sealed straw treatment protected the cores from significant shrinkage for the 3-day storage period for both the short and long core segments. The maximum shrinkage over this period (0.008 inch) is considered less than the measurement error incurred when measuring cores with hand-held rulers (regardless of the fineness of their graduations)--especially when no optical magnification is used.

The 3-day, sealed straw treatment gave better results than 30-minute water soaking for the 4.000-inch segments which represent situations where the heartwood or total core length is of interest. In this dry climate, the 30-minute water soaking is not long enough to restore air-dried heartwood of lodgepole pine increment cores.

A possibly detrimental effect of the sealed straw method was the growth of fungus on some cores sealed for 21 days. Although not a problem in this case, fungi could prove detrimental in identifying and measuring closely spaced annual rings.

A further improvement on the sealed plastic straw method is to freeze the cores after sealing them inside the plastic straws to maintain dimensions and prevent fungus growth. In an independent test of 10 lodgepole pine increment cores, no measurable change in length occurred in the cores during 3 days of freezer storage. Apparently, cores can be kept fresh for long periods, if frozen within a short time after being sealed in plastic straws.

RECOMMENDATIONS

From the above results, the following recommendations are made:

Core storage time	*Core storage method*
<1 day	unsealed straw
1-3 days	sealed straw
>3 days	sealed and frozen straw

When a freezer is not available and storage longer than 3 days is required, increment cores should be allowed to air-dry (but should be stored in unsealed straws for protection) and later soaked in water (at least 1-1/2 hours soaking is recommended for the drier western conditions) to restore their lengths.

PUBLICATION CITED

Brace, L. G.
1966. Radial shrinkage and swelling of increment cores. For. Chron. 42(4):387-389.

☆ U S GOVERNMENT PRINTING OFFICE: 1977-0-777-023-29